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EXAMINER	
POE, MICHAEL I	
ART UNIT	**PAPER NUMBER**
1732	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/973,086	Applicant(s) MOYES ET AL.
	Examiner Michael I Poe	Art Unit 1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5-7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in United Kingdom on October 12, 2000. It is noted, however, that applicant has not filed a certified copy of the United Kingdom application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 6-11 and 13-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 (Symons) in view of U.S. Patent No. 4,748,771 (Lehnert et al.).

Claims 1-4, 6-11 and 13-23

Symons teaches a method for forming a finished product including providing a feedstock of dry finely divided lignocellulosic fibers, exfoliated vermiculite particles, expanded perlite particles or a mixture of two or three thereof; mixing the feedstock with a blended mixture (submixture) of a suitable amount of a thermosetting resin in finely divided dry powder form and a suitable amount of a hydraulic binder in finely divided powder form to give a starting material; placing the starting material in a suitable press or mold (depositing into a mold and transferring the mold and thereby the mixture to a heated press); and compressing and heating the starting material in the press or mold at suitable conditions of temperature and pressure to cause the thermosetting resin to set (harden) to form a cohesive product (hardened slab); placing the cohesive product in an autoclave (removing the hardened slab from the mold); autoclaving and subjecting the cohesive product to a vacuum to allow penetration of a suitable quantity of water to thereby provide for complete hydration of the hydraulic binder to form the finished product (impregnating

the slab by immersion in water or by absorption of steam; applying a vacuum to the slab before it is immersed in water; immersing the slab in the water or allowing the slab to absorb steam for a period sufficient to hydrate the hydraulic binder) having a density between 700 and 2,000 kg/m^3; and drying the final product prior to decoration and/or shipping (page 2, 4th paragraph – page 3, 2nd paragraph; page 19, 1st and 2nd paragraphs; page 19, 6th paragraph – page 20, 1st paragraph; page 22, 1st paragraph; page 23, steps 1-7; page 24, "Example 2"). With regard to claims 2 and 4, see specifically steps 3-5 on page 23 of Symons.

With regard to claim 1, Symons does not specifically teach that the finishing product can be a fire door core. However, Lehnert et al. teach a method of forming a fire door components such as cores and strips including casting an aqueous slurry comprising expanded perlite or vermiculite, calcined gypsum, hydraulic cement, an organic binder, unexpanded vermiculite, clay and fibrous reinforcements; drying the slurry by application of heat; and cutting components of desired size from the casting (forming a fire door core) (column 3, lines 26-51; column 6, lines 48-62). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to use the molding techniques of Symons to produce fire door components such as a fire door core as taught by Lehnert et al. to provide fire door components that not only have the desired integrity and machineability of traditional fire door components, but that are also characterized by their ability to retain their strength, integrity and other characteristics throughout a long life (see column 2, lines 14-18 of Lehnert et al.).

With regard to claims 1, 6 and 11, Symons further teaches the mixture is placed in a suitable press or mold and then subjected to suitable conditions of pressure and temperature in the press or mold to allow the resin present to polymerize, harden or set (e.g., heating the mixture above the reaction temperature after the mixture is placed in the mold or press) (page 19, 1st paragraph). If the mixture was subjected to pressure and the reaction temperature only after the mixture was placed in the suitable press or mold as taught by Symons, one of ordinary skill in the art would have obviously recognized that the mold in the process of Symons must have been maintained at a temperature less than the reaction temperature of the resin while the mixture was being deposited in the mold and prior to the mixture and mold being placed in the press in order to prevent partial hardening. It would have been prima facie

obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to maintain the temperature of the mold below the reaction temperature in the process of Symons to prevent partial hardening of the mixture before the pressing step as would have been obvious as discussed above to thereby assure the effectiveness of the pressing step.

With regard to claims 3 and 22, Symons further teaches that the mass ratio of thermosetting resin to the hydraulic binder is from 1:50 to 1:5 and that the mass ratio of the hydraulic binder to the feedstock is from 1:2 to 20:1. Based on these mass ratios, Symons teaches that the mixture includes 0.7 – 16% thermoplastic resin by weight, 31.25 - 93.5% hydraulic binder by weight, and 4 – 66.2% exfoliated vermiculite, lignocellulosic fibers or expanded perlite particles by weight (page 4, 6th paragraph – page 5, 1st paragraph).

With regard to claims 7-10, Symons further teaches that the mixture may be compressed and heated in a suitable press or mold at temperatures from 125°C to 255°C and pressures of from 5 to 70 kg/cm^2 (i.e., about 71 psi to about 996 psi) to form the cohesive product (a core) having a density between 700 and 2,000 kg/m^3 by causing the thermoplastic resin to melt and flow to reinforce and bind in the matrix of the starting material (heating the mixture to a temperature above the reaction temperature of the resin for a period sufficient to react the resin and harden the mixture into a slab) (page 14, 4th paragraph; page 19, 2nd paragraph; page 22, 1st paragraph).

With regard to claim 17, although Symons in view of Lehnert et al. teaches drying the final product to a desired moisture content, Symons in view of Lehnert et al. does not specifically teach that the final product is dried to a moisture content in the claimed range. However, the final moisture content after drying of vermiculite containing products is a result effective variable as recognized by Symons in view of Lehnert et al. As such, one of ordinary skill in the art would have obviously determined the optimum final moisture content in the process of Symons in view of Lehnert et al. through routine experimentation based on the desired end use of the final product, the desired fire resistance properties of the final product, etc.

With regard to claims 16 and 18, Symons further teaches that the hydraulic binder is a substance that hydrates and sets in combination with water (to convert the hemi-hydrated gypsum to hydrated

gypsum; maintaining the gypsum as hydrated gypsum) and may be calcium sulphate hemihydrate either in the alpha or beta form (hemi-hydrated gypsum) (page 13, 3rd and 4th paragraphs).

With regard to claim 19, Symons further teaches that the thermosetting resin is preferably a novolac phenol formaldehyde resin with a suitable catalyst (novolac resins) and that the hydraulic binder is preferable selected from the group consisting of Portland Cement, high alumina cement, gypsum cement, calcium sulphate hemihydrate in either the alpha or beta form, magnesium oxychloride, magnesium oxysulphate, a calcium sulphoaluminate cement, an alkali substance, ground granulated blast furnace slag and mixtures thereof (page 4, 5th and 7th paragraphs).

With regard to claims 20 and 21, Symons further teaches that, in addition to the thermosetting resin and the hydraulic binder, the feedstock may be mixed with a suitable amount of filler material such as inorganic or mineral fibers, inorganic particles, synthetic fibers and mixture of two more thereof (page 5, 3rd paragraph).

4. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 (Symons) in view of U.S. Patent No. 4,748,771 (Lehnert et al.) as evidenced by U.S. Patent No. 3,793,134 (Hardy et al.).

Claims 5 and 12

The discussion of Symons and Lehnert et al. as applied to claim 1 above applies herein.

Although Symons in view of Lehnert et al. teaches the basic claimed process, Symons in view of Lehnert et al. does not specifically teach adding a release agent to the submixture wherein the release agent is about 1% by weight of the resin bonded exfoliated vermiculite mixture and applying a surface release agent to the mold. In this regard, Hardy et al. teach a molding process wherein, in order to aid in stripping the molded compacted mixture from the surfaces of the mold, either release agents or internal lubricants are introduced into the mixture of materials at approximately 1% by weight of the mixture or release agents are applied directly to the surfaces of the mold (column 7, lines 21-45; Example 3). As evidenced by Hardy et al., it was well known in the art at the time the invention was made to use both internal and external release agents in the claimed amounts in compression molding processes similar to the process of Symons in view of Lehnert et al. It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to

use either internal and/or external mold release agents in the process of Symons in view of Lehnert et al. as was well known in the art and as evidenced by Hardy et al. to provide cleaner release of the final product from the mold to thereby prevent damage to the final product.

5. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,746,555 (Luckanuck) in view of U.S. Patent No. 5,358,676 (Jennings et al.).

Claim 24

Luckanuck teaches an apparatus for the manufacture of fire door cores including a plurality of sources of raw materials such as wood chips, a silicate, a phenolic resin, perlite and/or vermiculite; a drum mixer (a mixing system) for admixing the raw materials from the sources (in communication with said raw material sources); trays (a plurality of molds) for receiving the raw materials poured from the drum mixer (each mold for operative communication with said mixing system); presses that receives stacks of the trays for pressing the raw materials to a desired thickness at a temperature of about 1550^{O}F (heated) to form the cores with simultaneous curing of the phenolic resin (a slab having a hardened state) (column 3, line 56 – column 4, line 6).

Although Luckanuck teaches the basic claimed process, Luckanuck does not specifically teach that the apparatus includes a vibratory assembly for receiving each of the molds and causing the mixed raw materials to achieve a substantially uniform density in the associated mold and that the vibratory assembly is in operative association with the heated press. However, Jennings et al. teach an apparatus for manufacturing hydraulically bonded cement including a vibratory packing means (a vibratory assembly) for causing particles (mixed raw materials) in a mold to pack to a density consistent with the geometric and material characteristics of the system (to achieve substantially uniform density in the associated mold) that is typically used in conjunction with a pressure compaction means (a heated press in operative association with said vibratory assembly) (column 9, lines 14-27 and 55-64). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to use a vibratory packing means in association with the presses in the process of Luckanuck as taught by Jennings et al. to thereby more rapidly obtain the desired packing densities and even obtain higher packing densities (see specifically column 9, lines 55-64 of Jennings et al.).

Claim 25

The discussion of Luckanuck and Jennings et al. as applied to claim 24 above applies herein.

Although Luckanuck teaches the basic claimed process, Luckanuck further does not specifically teach that the apparatus includes a water impregnation system operatively associated with the press for impregnating the hardened slabs with water or steam and a drying assembly operatively associated with the water impregnation system for drying the slabs to predetermined moisture contents. However, Jennings et al. further teaches that the mechanically self-supporting article from the pressure compaction means (operatively associated with the press) is hydrated by a hydration means (a water impregnation system) that contacts article with gaseous water such that the water diffuses into the article (for impregnating the hardened slabs with water or steam) and subsequently (operatively associated with the water impregnation system) dried in a drying means (a drying assembly) to remove water (for drying the slabs to a predetermined moisture content) (column 12, line 53 – column 13, line 8; column 15, lines 38-48). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to employ a hydration means and a drying means in the process of Luckanuck as taught by Jennings et al. to thereby increase the tensile and compressive strength, the surface durability, and the density of the finished product while reducing porosity (see specifically column 15, lines 38-48 of Jennings et al.).

6. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 (Symons).

Claims 26 and 27

Symons teaches a method for forming a finished product including providing a feedstock of dry finely divided lignocellulosic fibers, exfoliated vermiculite particles, expanded perlite particles or a mixture of two or three thereof; mixing the feedstock with a blended mixture of a suitable amount of a thermosetting resin in finely divided dry powder form and a suitable amount of a hydraulic binder in finely divided powder form to give a starting material; placing the starting material in a suitable press or mold (depositing into a mold and transferring the mold and thereby the mixture to a heated press); and compressing and heating the starting material in the press or mold at suitable conditions of temperature and pressure to cause the thermosetting resin to set (harden) to form a cohesive product (a slab); placing

the cohesive product in an autoclave (removing the hardened slab from the mold); autoclaving and subjecting the cohesive product to a vacuum to allow penetration of a suitable quantity of water to thereby provide for complete hydration of the hydraulic binder to form the finished product having a density between 700 and 2,000 kg/m^3; and drying the final product for decoration and/or shipping (page 2, 4th paragraph – page 3, 2nd paragraph; page 19, 1st and 2nd paragraphs; page 19, 6th paragraph – page 20, 1st paragraph; page 22, 1st paragraph; page 23, steps 1-7; page 24, "Example 2").

With regard to claim 26, Symons does not specifically teach that the mold is maintained at a temperature less than the reaction temperature of the resin while the mixture was being deposited in the mold. However, Symons further teaches the mixture is placed in a suitable press or mold and then subjected to suitable conditions of pressure and temperature in the press or mold to allow the resin present to polymerize, harden or set (e.g., heating the mixture above the reaction temperature after the mixture is placed in the mold or press) (page 19, 1st paragraph). If the mixture was subjected to pressure and the reaction temperature only after the mixture was placed in the suitable press or mold as taught by Symons, one of ordinary skill in the art would have obviously recognized that the mold in the process of Symons must have been maintained at a temperature less than the reaction temperature of the resin while the mixture was being deposited in the mold to prevent partial hardening of the mixture. It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to maintain the temperature of the mold below the reaction temperature in the process of Symons to prevent partial hardening of the mixture before the pressing step as would have been obvious as discussed above to thereby assure the effectiveness of the pressing step.

With regard to claim 27, Symons further teaches that the mixture may be compressed and heated in a suitable press or mold at temperatures from $125^{O}C$ to $255^{O}C$ and pressures of from 5 to 70 kg/cm^2 (i.e., about 71 psi to about 996 psi) to form the cohesive product (a hardened slab) having a density between 700 and 2,000 kg/m^3 by causing the thermoplastic resin to melt and flow to reinforce and bind in the matrix of the starting material (page 14, 4th paragraph; page 19, 2nd paragraph; page 22, 1st paragraph).

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 (Symons) in view of U.S. Patent No. 4,748,771 (Lehnert et al.).

Claim 28

The discussion of Symons as applied to claim 26 above applies herein.

Symons does not specifically teach that the finishing product is reduced into at least first and second strips for fire door support structures. However, Lehnert et al. teach a method of forming a fire door components such as cores and strips including casting an aqueous slurry comprising expanded perlite or vermiculite, calcined gypsum, hydraulic cement, an organic binder, unexpanded vermiculite, clay and fibrous reinforcements; drying the slurry by application of heat; and cutting components of desired size from the casting (reducing the hardened slab into at least first and second strips for fire door support structures) (column 3, lines 26-51; column 6, lines 48-62). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to use the molding techniques of Symons to produce fire door components such as cores and strips as taught by Lehnert et al. to provide fire door components that not only have the desired integrity and machineability of traditional fire door components, but that are also characterized by their ability to retain their strength, integrity and other characteristics throughout a long life (see column 2, lines 14-18 of Lehnert et al.).

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 (Symons) in view of U.S. Patent No. 4,191,667 (Wehrmann et al.).

Claim 29

The discussion of Symons as applied to claim 26 above applies herein.

Symons does not specifically teach that the exfoliated vermiculate is up to 10% recycled vermiculate materials. However, Wehrmann et al. teach a process for forming building elements including forming expanded vermiculite granules coated with 2 to 30% by weight, based on the weight of vermiculite, with an organic binder into a press cake and press heating the press cake to form a building element wherein shredded trimmings or scrap pieces and/or dust particles from the grinding operations are admixed with the expanded unsized vermiculite granules in a weight ratio of 5 to 30% (providing up to 10% by weight of exfoliated vermiculite from recycled vermiculite materials) (abstract; column 1, line 50 –

column 2, line 2). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to use vermiculite waste particles as part of the expanded vermiculite in the process of Symons as taught by Wehrmann et al. to thereby solve the problem of waste disposal while at the same time providing a product having improved characteristics (see column 1, line 50 – column 2, line 2 of Wehrmann et al.).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 4,127,628 (Uchida et al.), 4,447,380 (Shannon et al.), 4,524,039 (Bevan), 5,723,226 (Francis et al.) and 6,554,893 B2 (Klus) have been cited of interest to show the state of the art at the time the invention was made.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael I Poe whose telephone number is (703) 306-9170. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on (703) 305-5493. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1234.

Michael Poe

Michael Poe/mip

Michael Colaianni

MICHAEL COLAIANNI
PRIMARY EXAMINER